

*Peterson 18
Serial No. 09/915,963*

Remarks

Extension of Time

Accompanying this response is a petition extending time for response by two (2) months from June 20, 2006 to August 20, 2006.

Finality of the Office Action

On May 12, 2006 Applicant filed a request for reconsideration of the finality of the Office action of March 20, 2006. In an Office action dated July 19, 2006 the Examiner found Applicant's request persuasive and did indeed withdraw the finality of the March 20, 2006 action.

Amendments

No amendments have been made to the claims.

Claims 1, 3-11, and 13-25 remain in the application.

No amendments have been made to the specification or the drawing.

Allowable Claims

Applicant acknowledges and gratefully appreciates that the the Examiner has once again indicated that Claims 4, 14, and 22 would be allowable if rewritten in dependent form including all of the limitations of their base claims and any intervening claims.

Claims Impacted by the Board's Decision

In its decision in Appeal No. 2005-2760 the Board held as follows:

- (1) It reversed the Section 102(e) rejection of Claims 1, 3, 5-9, 11, 13 and 15-18.
- (2) It reversed the Section 112 rejection of appealed, dependent Claims 2 and 12, which required that the at least one tapered antenna element comprise a traveling wave antenna supporting a phase velocity greater than the speed of light. In Applicant's response of November 28, 2005 this feature was added to independent Claims 1, 11 and 21. Accordingly, Claims 2 and 12 were canceled.
- (3) It sustained the Section 103 rejection of appealed Claims 10, 19, 21 and 23-25.

Peterson 18
Serial No. 09/915,963

- (4) It stated that Ogot provides for the deficiencies of Wicks regarding the Section 102(e) rejection of appealed Claims 1, 3, 5-9, 11, 13 and 15-18, but noted that no Section 103 rejection was before them regarding these claims.
- (5) It made a new Section 103 rejection of appealed, independent Claims 1 and 11.
- (6) It made "no representations or new grounds of rejection regarding [appealed] claims 3, 5-9, 13 and 15-18. We leave those claims for the examiner to revisit if the examiner deems it advisable..."

Claim Rejections – 35 USC §103 (Claims 1, 3, 5-11, 13, 15-18)

Claims 1, 3, 5-11, 13, 15-21 and 23-25 have been rejected under 35 USC §103(a) as being unpatentable over M. C. Wicks *et al.*, US Statutory Invention Registration No. H2016H published on April 2, 2002 (hereinafter *Wicks*) in view of R. B. Ogot *et al.*, US Patent No. 5,648,787 issued on January 15, 1997 (hereinafter *Ogot*) and further in view of J. D. Kraus, "Antennas," 2nd Ed., McGraw Hill, Inc., New York (1988), pp. 759-760 (hereinafter, *Kraus*).

For reasons that are unclear, the Examiner explains the Section 103 rejection *only* for Claims 1, 3, 5-11 and 15-18. In his explanation the Examiner largely applies Wicks and Ogot as in previous Office actions. However, in the present Office action he combines Wicks and Ogot with Kraus as follows:

Wicks et al. and Ogot et al. teach every feature of the claimed invention except for the at least one antenna element comprises a traveling wave antenna supporting a phase velocity greater than the speed of light; and a slow wave antenna to widen the directivity of the antenna structure.

Kraus teaches in figures 16-41 & 16-42 the at least one antenna element (Leaky-wave antennas) comprises a traveling wave antenna supporting a phase velocity greater than the speed of light; and a slow wave antenna (Surface-wave antenna) to widen the directivity of the antenna structure.

In view of the above statement, it would have been obvious...by using leaky-wave antenna or surface-wave antenna as taught by Kraus in order to have the structure carries a fast wave ($c > v$) or slow wave ($v < c$) (See pp759-760).

This rejection is respectfully traversed for the reasons set forth below:

Peterson 18
Serial No. 09/915,963

- (1) **Summary of the Invention:** It will be helpful to recall that Applicant's antenna structure, as defined by independent Claims 1, 11 and 21, requires that the "at least one antenna element comprises a traveling wave antenna supporting a phase velocity greater than the speed of light;" that is, a fast wave antenna ($v > c$). In addition, in one embodiment, as set forth in Claim 20, which depends from Claim 11, Applicant's invention also requires "a slow wave antenna to widen the directivity of the antenna structure" in combination with the fast wave antenna. In a slow wave antenna $v < c$.
- (2) **Improper Combination:** It is black letter law that a proper Section 103 rejection "requires some reason, suggestion, or motivation from the prior art as a whole for the person of ordinary skill to have combined or modified the references" in the manner suggested by the Examiner. [See, I. H. Donner, *Patent Prosecution*, 3rd Ed., BNA Washington, DC (2003), p. 778.] Applicant submits that the above-quoted portion of the Examiner's rejection, which is the only portion that discusses Kraus, fails to explain *why one skilled in the art would be motivated to modify* the Wicks-Ogot combination in accordance with the fast wave ($v > c$) traveling wave design of Kraus. Without a clear indication of such motivation, the Examiner's statement is merely an unsupported conclusion. It is, moreover, clearly an impermissible use of hindsight and Applicant's own teaching. For this reason alone, Claims 1, 11 and 21 are not obvious in view of Wicks, Ogot and Kraus.
- (3) **TEM Propagation:** As Applicant, Dr. G. E. Peterson, has pointed out several times in previous responses, Wicks teaches away from the use of a fast wave antenna; to wit, at column 2, lines 66-67, Wicks specifically teaches that the *slot transmission line has a TEM mode of propagation*. As noted in Applicant's July 11, 2002 traversal of the Section 112 rejection in the first Office action, a TEM wave (or mode) is a *slow wave*, which means that its phase velocity is *less than* the speed of light, *not greater than* the speed of light as required by Claims 1, 11 and 21. Therefore, one skilled in the art would be deterred from applying the Kraus fast wave antenna ($v > c$) to the Wicks antenna design and thus to the Wicks-Ogot combination.
- (4) **Directivity:** Applicant's Claim 20 is directed to an embodiment that widens directivity by adding a slow wave element [FIG. 4(a); element 220] to the antenna structure that

Peterson 18
Serial No. 09/915,963

already includes a fast wave element [FIG. 4(a); elements 210, 215]. As noted above, Kraus fails to suggest the use of a fast wave antenna element in the Wicks-Ogot combination. Kraus likewise fails to suggest that a slow wave antenna widens directivity. Accordingly, it likewise fails to suggest the use of *both* a fast wave element and a slow wave element in the same antenna structure.

- (5) **Exponential Profile:** Regarding dependent Claims 3 and 13, the Examiner argues that Wicks teaches in figures 1-5 the antenna structure wherein the taper comprises an *exponential profile*. Apparently the Examiner is referring to the curved segment A, B, C, D of the mono-blade, which Wicks (column 3, lines 23-38) unambiguously describes as follows: “*Using a gradual change in the curvature, the geometry from point B to point C is approximately an arc of constant radius...The physical shape of the blade from point C to point D is approximately an arc of constant radius....*” Clearly, an arc of constant radius is a circle; it does not have an exponential profile, as called for in two of the embodiments of Claims 3 and 13. In fact, Wicks is totally devoid of any mention of the term *exponential*. Therefore, it is Applicant’s position that Claims 3 and 13 are patentable for two reasons: (i) by virtue of their dependence from Claims 1 and 11 for the reasons set forth above and incorporated herein by reference; and (ii) because Wick does not teach or suggest an exponential taper, and since neither Ogot nor Kraus is relied upon to show or suggest this feature.

Claim Rejections – 35 USC §103 (Claims 19-21, 23-25)

Although Claims 19-21 and 23-25 were ostensibly rejected under Section 103 by the Examiner, as noted above, the Examiner provided no explanation as to how Wicks, Ogot and Kraus were to be applied against these specific claims.

In the absence of such an explanation, it is respectfully submitted that no *prima facie* case of obviousness has not been made against these claims.

Moreover, Applicant further respectfully submits: (1) Claims 19-20 are patentable by virtue of their dependence from Claim 11, for the reasons discussed above regarding Claim 11 and incorporated herein by reference; (2) Independent Claim 21 is patentable for the reasons discussed

Peterson 18
Serial No. 09/915,963

above regarding Claims 1 & 11 and incorporated herein by reference; and (3) Claims 23-25 are patentable by virtue of their dependence from Claim 21.

Conclusion

In view of the foregoing, reconsideration of claims 1, 3, 5-11, 13, 15-21 and 23-25, and passage of this application to issue, are hereby respectfully requested. If during the consideration of this paper, the Examiner believes that resolution of the issues raised will be facilitated by further discussion, he is urged to contact the undersigned attorney at 610-691-7710 (voice) or 610-691-8434 (fax).

Respectfully,
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